

What is claimed is:

1. A method for preparing a Li-Mn-Ni oxide for a lithium secondary battery having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < X < 0.6$), comprising the steps of:

a) preparing an aqueous solution by resolving lithium salt, manganese salt and nickel salt into distilled water;

b) forming gel by heating the aqueous solution;

c) preparing oxide powder by burning the gel;

d) performing a first thermal treatment on the oxide powder, and grinding the resultant; and

e) performing a second thermal treatment on the resultant powder, and grinding the resultant.

2. The method as recited in claim 1, wherein the lithium salt, manganese salt and nickel salt are water-soluble salts.

3. The method as recited in claim 1, wherein the lithium salt is lithium acetate dihydrate ($\text{CH}_3\text{CO}_2\text{Li} \cdot 2\text{H}_2\text{O}$), and the manganese salt and the nickel salt are manganese acetate tetrahydrate ($(\text{CH}_3\text{CO}_2)_2\text{Mn} \cdot 4\text{H}_2\text{O}$) and nickel(II) nitrate hexahydrate ($\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$), respectively.

4. The method as recited in claim 1, wherein the gel is burnt at a temperature of $400 \sim 500^\circ\text{C}$.

5. The method as recited in claim 1, wherein the first thermal treatment is performed at a temperature of 400 ~ 500°C.

6. The method as recited in claim 1, wherein the second thermal treatment is performed at a temperature of 700 ~ 1000°C.

7. A method for preparing a Li-Mn-Ni oxide for a lithium secondary battery having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < x < 0.6$), comprising the steps of:

a) preparing an aqueous solution by resolving lithium acetate dihydrate ($\text{CH}_3\text{CO}_2\text{Li} \cdot 2\text{H}_2\text{O}$), manganese acetate tetrahydrate ($(\text{CH}_3\text{CO}_2)_2\text{Mn} \cdot 4\text{H}_2\text{O}$) and nickel(II) nitrate hexahydrate ($\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) into distilled water;

b) forming gel by heating the aqueous solution at over 100°C;

c) preparing oxide powder by burning the gel;

d) performing a first thermal treatment on the oxide powder, and grinding the resultant; and

e) performing a second thermal treatment on the resultant powder at a temperature of 700 ~ 1000°C, and grinding the resultant.

8. A Li-Mn-Ni oxide having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < x < 0.6$) prepared by using a method for preparing a Li-Mn-Ni oxide for a lithium secondary battery, the method comprising the steps of:

a) preparing an aqueous solution by resolving lithium salt, manganese salt and nickel salt into distilled water;
b) forming gel by heating the aqueous solution;
c) preparing oxide powder by burning the gel;
5 d) performing a first thermal treatment on the oxide powder, and grinding the resultant; and
e) performing a second thermal treatment on the resultant powder, and grinding the resultant.

10 9. A Li-Mn-Ni oxide having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < x < 0.6$) prepared by using a method for preparing a Li-Mn-Ni oxide for a lithium secondary battery, the method comprising the steps of:

a) preparing an aqueous solution by resolving lithium
15 acetate dihydrate ($\text{CH}_3\text{CO}_2\text{Li} \cdot 2\text{H}_2\text{O}$), manganese acetate tetrahydrate ($(\text{CH}_3\text{CO}_2)_2\text{Mn} \cdot 4\text{H}_2\text{O}$) and nickel(II) nitrate hexahydrate ($\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) into distilled water;

b) forming gel by heating the aqueous solution at over 100°C ;

20 c) preparing oxide powder by burning the gel;

d) performing a first thermal treatment on the oxide powder, and grinding the resultant; and

e) performing a second thermal treatment on the resultant powder at a temperature of $700 \sim 1000^\circ\text{C}$, and
25 grinding the resultant.

10. A lithium secondary battery including a Li-Mn-Ni

oxide having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < x < 0.6$) which is prepared by using a method for preparing a Li-Mn-Ni oxide for a lithium secondary battery, the method comprising the steps of:

- 5 a) preparing an aqueous solution by resolving lithium salt, manganese salt and nickel salt into distilled water;
- b) forming gel by heating the aqueous solution;
- c) preparing oxide powder by burning the gel;
- d) performing a first thermal treatment on the oxide
10 powder, and grinding the resultant; and
- e) performing a second thermal treatment on the resultant powder, and grinding the resultant.

11. A lithium secondary battery including a Li-Mn-Ni
15 oxide having a composition of $\text{Li}[\text{Ni}_x\text{Li}_{(1/3-2x/3)}\text{Mn}_{(2/3-x/3)}\text{O}_2$ ($0.05 < x < 0.6$) prepared by using a method for preparing a Li-Mn-Ni oxide for a lithium secondary battery, the method comprising the steps of:

- a) preparing an aqueous solution by resolving lithium
20 acetate dihydrate ($\text{CH}_3\text{CO}_2\text{Li} \cdot 2\text{H}_2\text{O}$), manganese acetate tetrahydrate ($(\text{CH}_3\text{CO}_2)_2\text{Mn} \cdot 4\text{H}_2\text{O}$) and nickel(II) nitrate hexahydrate ($\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) into distilled water;
- b) forming gel by heating the aqueous solution at over 100°C ;
- 25 c) preparing oxide powder by burning the gel;
- d) performing a first thermal treatment on the oxide powder, and grinding the resultant; and

e) performing a second thermal treatment on the resultant powder at a temperature of 700 ~ 1000°C, and grinding the resultant.